

**Federal Service for Hydrometeorology
and Environmental Monitoring**



**VOEIKOV
MAIN GEOPHYSICAL
OBSERVATORY**

Since 1849

GHG measurements in Tiksi as an evidence of methane concentration anomalies absence in East Siberian Arctic Shelf (ESAS).

Abstract:

The time-series of two years continuous methane measurements in Tiksi, also the results of two flask measurement research vessel Arctic campaigns are given. According to the data high CH₄ concentration anomalies (>2900 ppb) are not observed. This fact collides with the data presented by the scientists from Pacific Oceanological Institute which detected high atmospheric concentrations in tens of kilometers from Tiksi.

Reshetnikov A. I., Ivakhov V. M.

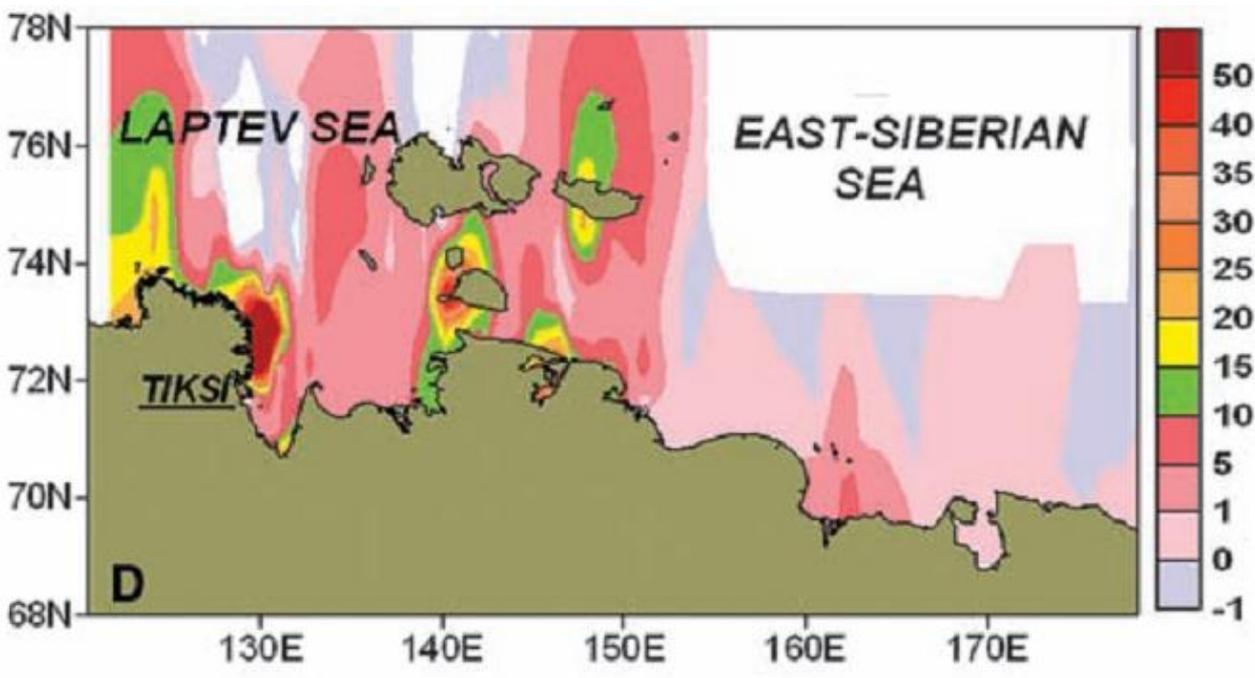
In recent years the question of possible contribution of cryolithospheric Arctic zone to atmospheric methane concentration fields is widely discussed, especially due to climate change.

Main carbon sources are as follows:

- release of CH₄ from its hydrates
- degrading terrestrial and sub-sea permafrost
- coastal erosion
- carbon transport by rivers
- thermokarst lakes (taliks)

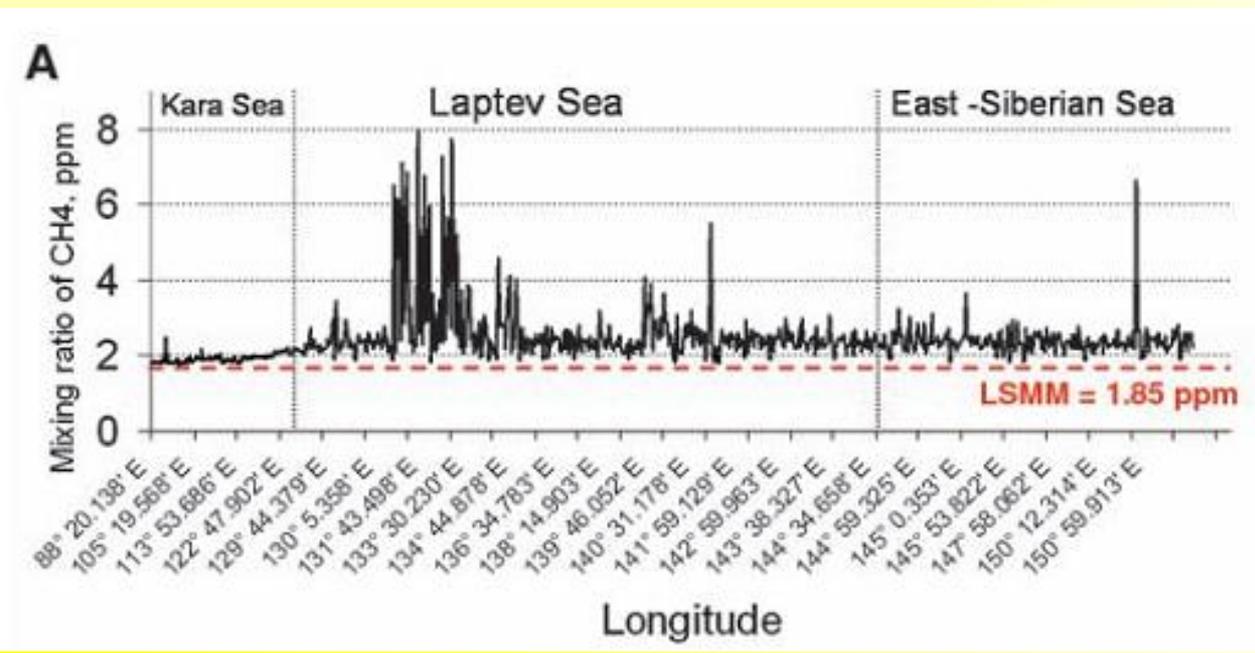
Methane observations in this region are not numerous and regular. The greatest number of field studies in the region conducted by Semiletov's group from Pacific Oceanological Institute (POI)

Continuous and regular flask measurements of CH₄ and CO₂ in Tiksi started by FMI, NOAA and MGO should become significant contribution to already existent data sets.



Fluxes of CH₄ venting to the atmosphere over the ESAS (Science VOL 327, p. 1247)

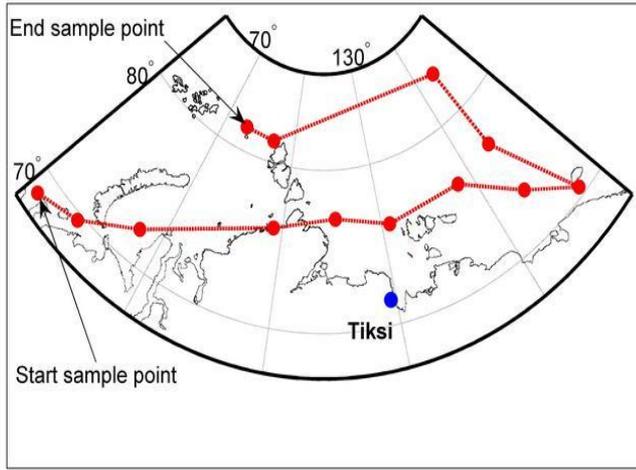
Maximal values of methane fluxes were observed in several tens kilometers from Tiksi



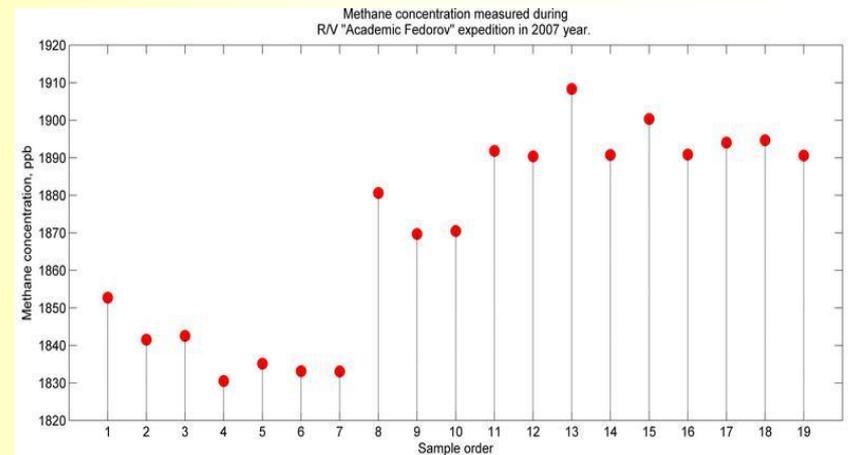
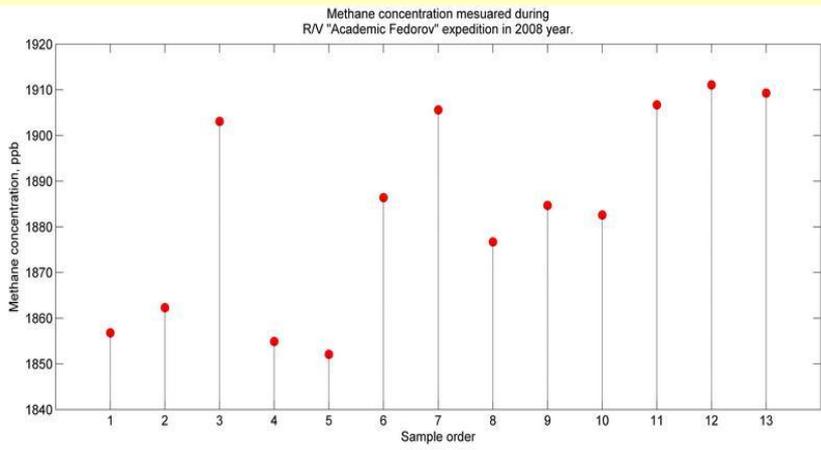
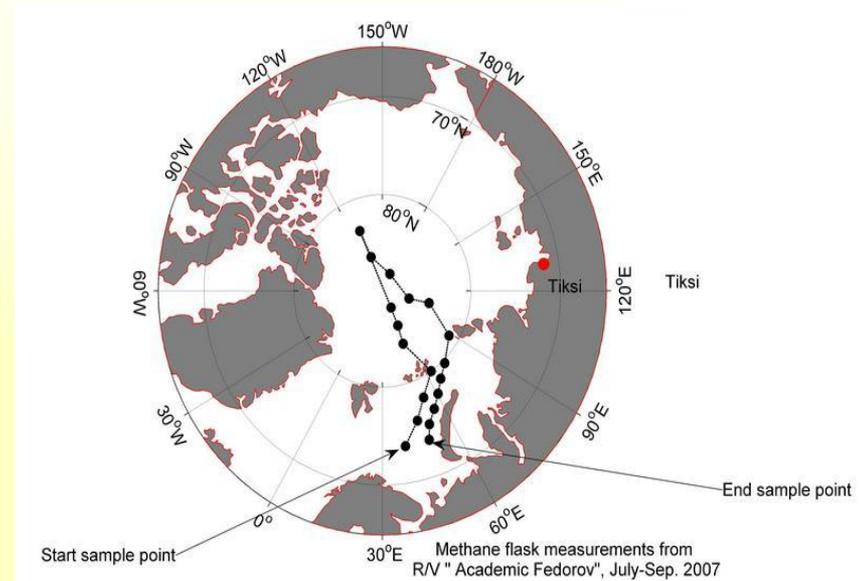
Concentration of CH₄ in the air measured along the ship route in September 2005

According to R/V data obtained by scientists from POI in September 2005, the mean CH₄ concentration of 2970 ± 15 ppb was measured in the Laptev sea region.

CO2 and CH4 flask measurements from R/V "Academic Fedorov", Aug-Sep. 2008

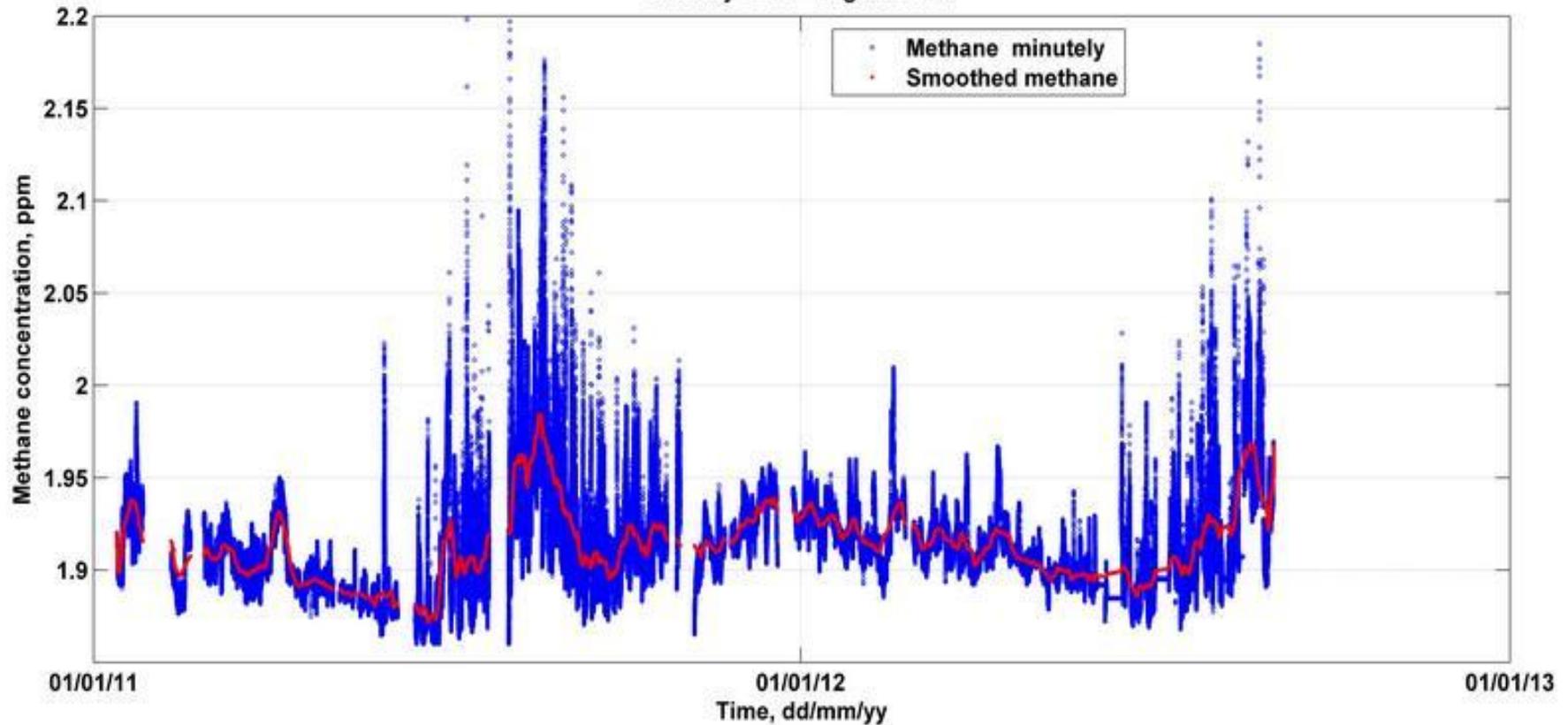


Methane concentration observed in September 2007 during Arctic expedition of r/v «Academic Fedorov»



Methane concentration observed in August-September 2008 during Arctic expedition of r/v «Academic Fedorov»

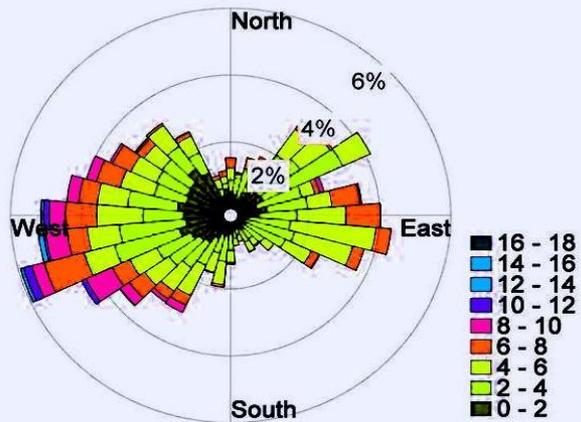
Methane atmospheric concentration in Tiksi.
January 2011 - August 2012.



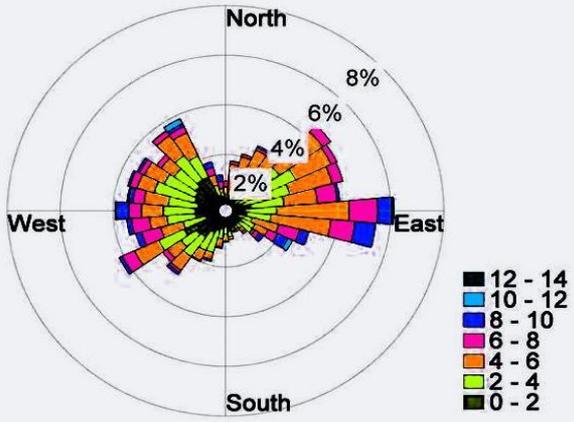
Minutely methane data (blue) and smoothed curve (red)

The mean value does not exceed 2000 ppb. The maximal variance of minute data is about 200 ppb, the main cause of that is proximity of wetland to the CAF.

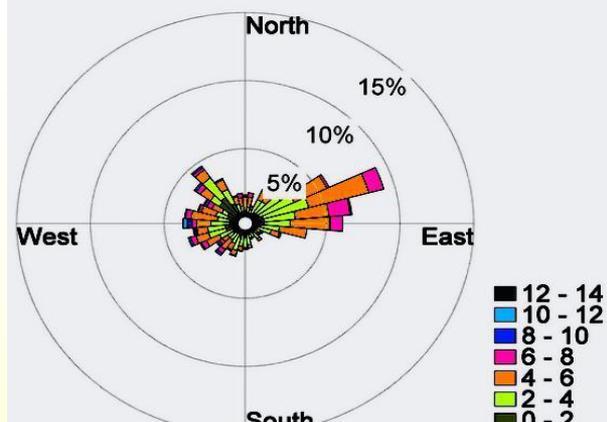
Wind rose. Tiksi. July-September 2010.



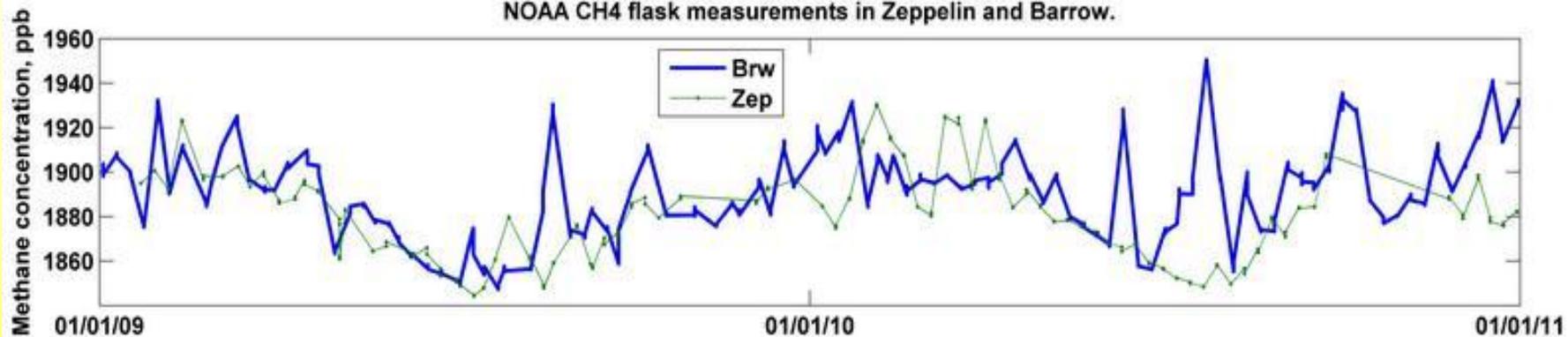
Wind rose. Tiksi. July-September 2011.



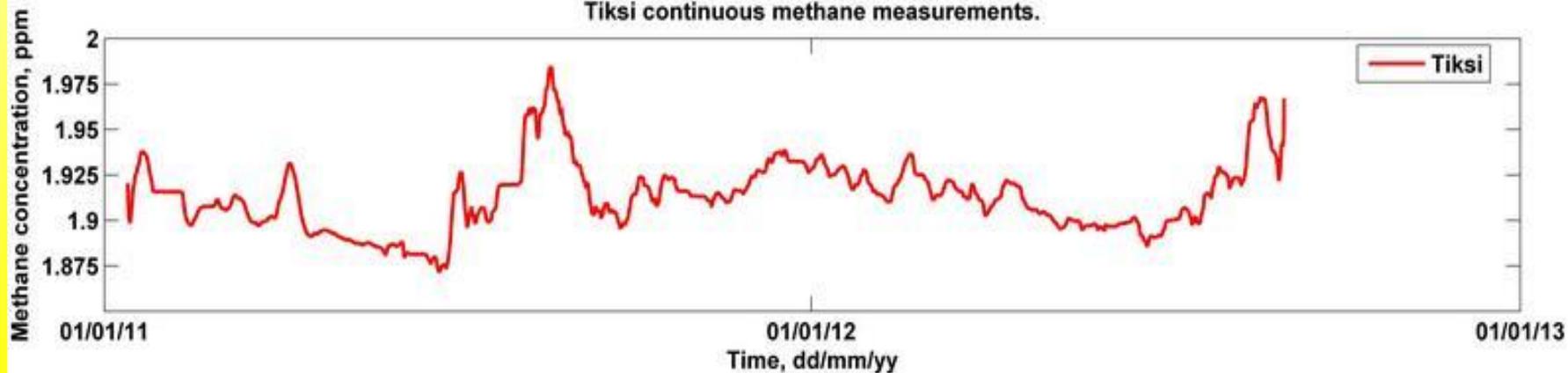
Wind rose. Tiksi. July-August 2012.

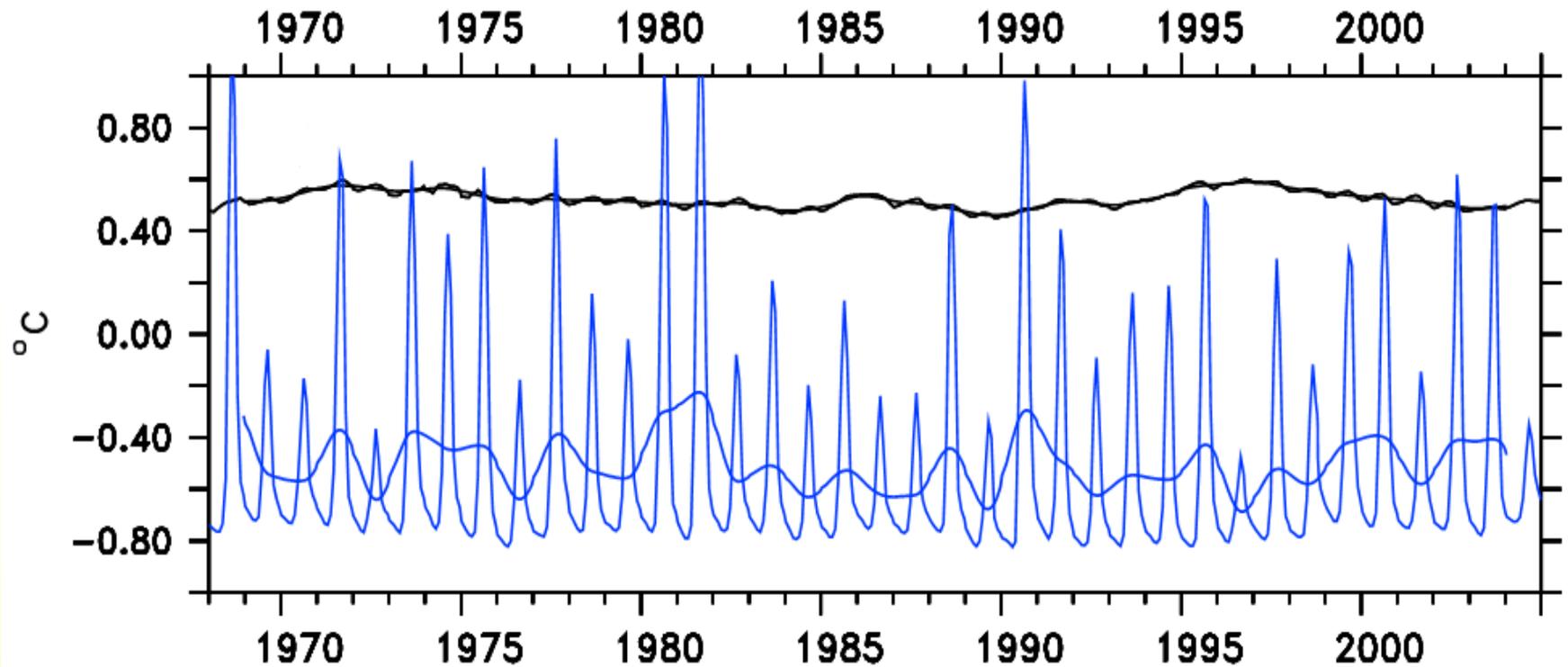


NOAA CH4 flask measurements in Zeppelin and Barrow.



Tiksi continuous methane measurements.





Variability of temperatures in the hindcast simulation, shown by monthly and inter-annually filtered temperatures along the Russian continental slope, (black, 416–793 m, 90–180°E) and on the shelf (blue, 0–100 m) in the Laptev Sea

Thanks for attention!